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Research Article

Disruption of the ovarian follicle reservoir of prepubertal rats following prenatal exposure to a continuous 900-MHz electromagnetic field

Sibel Türedi, Hatice Hancı, Serdar Çolakoğlu, Haydar Kaya & **Ersan Odacı**

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Abstract

The effects on human health of electromagnetic field (EMF) have begun to be seriously questioned with the entry into daily life of devices establishing EMF, such as cell phones, wireless fidelity, and masts. Recent studies have reported that exposure to EMF, particularly during pregnancy, affects the developing embryo/fetus. The aim of this study was therefore to examine the effects of exposure to continuous 900-Megahertz (MHz)

EMF applied in the prenatal period on ovarian follicle development and oocyte differentiation. Six pregnant Sprague Dawley rats were divided equally into a non-exposed control group (CNGr) and a group (EMFGr) exposed to continuous 900-MHz EMF for 1 h daily, at the same time every day, on days 13–21 of pregnancy. New groups were established from pups obtained from both groups after birth. One group consisting of female pups from CNGr rats was adopted as newborn CNGr (New-CNGr, $n = 6$), and another group consisting of female pups from EMFGr rats was adopted as newborn EMFGr (New-EMFGr, $n = 6$). No procedure was performed on New-CNGr or New-EMFGr rats. All rat pups were sacrificed on the postnatal 34th day, and their ovarian tissues were removed. Follicle count, histological injury scoring and morphological assessment with apoptotic index criteria were performed with sections obtained following routine histological tissue preparation. Follicle count results revealed a statistically significant decrease in primordial and tertiary follicle numbers in New-EMFGr compared to New-CNGr ($p < 0.05$), while atretic follicle numbers and apoptotic index levels increased significantly ($p < 0.05$). Histopathological examination revealed severe follicle degeneration, vasocongestion, a low level of increased stromal fibrotic tissue and cytoplasmic vacuolization in granulosa cell in New-EMFGr. Prenatal exposure to continuous 900-MHz EMF for 1 h each day from days 13–21 led to a decrease in ovarian follicle reservoirs in female rat pups at the beginning of the prepubertal period.

Keywords: Cell phone electromagnetism rat ovary prepubertal period fertility

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